Chapter Five:

5.0 RECOMMENDED ELEMENTS FOR THE TRANSIT CAPITAL PROGRAM

Chapter Five describes the elements recommended for the MTA Capital Program through text, figures, and tables. The actual multi-year capital plan is presented in Chapter Six. Therefore, it is recommended that the two chapters be read together.

5.1 TRANSIT APP

The top request from riders was for development of a transit application (APP) that would provide real time information. MTA has already started a procurement for such a system by identifying the features it desires. These are: upgrade of the GPS system including the hardware and the software (compatible with existing Calamp). In addition, to have the features with automatic vehicle tracking, APC, and audio/visual displays. The cost for the system is estimated at just under $500,000, which can be funded over two years.

5.2 TRANSIT FLEET

Far and away the most important capital need for the current transit program is to get a reliable fleet, replacing the current vehicles, and expanding to a fleet that is dependable and suited to the type of services being provided.

The effects on service, rider confidence, and MTA pride due to breakdowns and the non-availability of the equipment and "dead" vehicles has been described elsewhere in this plan and will not be repeated here. As of 2015, Hele-On had 55 vehicles listed in their bus fleet. However, 18 buses were listed as not operable or repairable. This was pared down to 37 in 2016. The current running fleet consists of 19 buses shown in Table 5-1. Of those, seven were gifted this past summer from the City and County of Honolulu from their retiring fleet. These buses are in good repair, but their useful life is limited. MTA does not directly operate the paratransit services and therefore, does not have a paratransit fleet.

Table 5-1. Hele-On Active Bus Fleet (as of November 2017)

Year	Qty	Make	Bus Numbers	Seating Capacity
1997	8	Gillig	341-347, 667	45
2006	1	Chevy	501	26
2007	2	Gillig	409-410	45
2008	1	Chevy	102	15
2010	3	MCI	601-605	50
2014	1	MCI	610	49
2014	1	Eldorado	803	42
2015	2	MCI	612-613	49
Total	**19**			

5.2.1 Transit Fleet Size and Composition

The current running fleet is 19 buses, well below what is required to operate current bus routes. The CIP places an emphasis on rebuilding the fleet. Table 4-5 presented a suggested fleet replacement and expansion plan based on the proposed service plan in chapter 4. The number of vehicles needed for current service is 36. The number needed for full implementation is 55, including spares.

As Fiscal Year 2018 is half over, no new vehicles are expected to be added to the fleet.

Starting in Fiscal Year 2019, it is recommended that three smaller and four 40' vehicles be procured and added to the fleet. The following year 2020 should add seven less than 30' vehicles. Table 5-2 is a replacement and expansion schedule which shows the number of vehicles required to operate the service. Currently and over the next several years into the future, MTA will continue to require contracting with private providers for buses. If funds become available, such as additional grant opportunities, then a more aggressive bus acquisition program should be pursued.

The Financial Plan in Chapter Six uses the following estimates for cost of the three types of vehicles needed for service. The estimated cost includes the electronics package described in Section 5.2.3. It averages to about $19,000 per vehicle.

- **20-foot or less** **$220,000**
- **25 to 30-foot** **$310,000**
- **40-foot vehicle** **$576,300**

These costs listed above are escalated by 1.2 percent per year in the CIP.

5.2.2 Fleet Replacement

By 2027, the fleet size of 58 vehicles required to operate current and expanded services will be procured. This total number includes all vehicles including commuter services currently provided by private operators using their coaches. If MTA desires to continue the commuter service with coaches provided by private operators, then the fleet acquisition plan can be reduced. The vehicle spare ratio will be at 20 percent in 2027.

From 2027 on, MTA should continue to purchase four to five vehicles a year to maintain the fleet. The spare

Table 5-2. Fixed Route Fleet Replacement and Expansion Schedule

Budget Year	Model Year	Bus Description	SIZE (FT)	BUS NO. SERIES	FISCAL YEAR										
					2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
	1997	Gillig	40'	341-347, 667	8	8	8	8	5						
	2006	Chevy-26 pass	25'	501	1	1	1	1							
	2007	Gillig	40'	409-410	2	2	2	2	2	2					
	2008	Chevy-15 Pass	16'	102	1	1	1	1							
	2010	MCI	40'	601-605	3	3	3	3	3	3	3	3	3	3	3
	2014	MCI	40'	610	1	1	1	1	1	1	1	1	1	1	1
	2014	Eldorado	40'	803	1	1	1	1	1	1	1	1	1	1	
	2015	MCI	40'	612-613	2	2	2	2	2	2	2	2	2	2	2
2018	2019	Standard Diesel	40'												
2018	2019	Standard Diesel	<30'				3	3	3	3	3	3	3	3	3
2019	2020	Standard Diesel	40'				4	4	4	4	4	4	4	4	4
2019	2020	Standard Diesel	<30'					7	7	7	7	7	7	7	7
2020	2021	Standard Diesel	40'						3	3	3	3	3	3	3
2020	2021	Standard Diesel	<30'						3	3	3	3	3	3	3
2021	2022	Standard Diesel	40'							3	3	3	3	3	3
2021	2022	Standard Diesel	<30'							3	3	3	3	3	3
2022	2023	Standard Diesel	40'								3	3	3	3	3
2022	2023	Standard Diesel	<30'								5	5	5	5	5
2023	2024	Standard Diesel	40'									3	3	3	3
2023	2024	Standard Diesel	<30'										3	3	3
2024	2025	Standard Diesel	40'										3	3	3
2024	2025	Standard Diesel	<30'											2	2
2025	2026	Standard Diesel	40'											3	3
2025	2026	Standard Diesel	<30'												
2026	2027	Standard Diesel	40'												4
2026	2027	Standard Diesel	<30'												
				Total Active Bus Fleet	**19**	**19**	**26**	**33**	**34**	**35**	**39**	**42**	**47**	**52**	**54**
				Peak Assignment	29	29	32	35	35	38	40	42	45	45	45
				Spares	-10	-10	-6	-2	-1	-3	-1	0	2	7	9
				Spare Ratio	-34.48%	-34.48%	-18.75%	-5.71%	-2.86%	-7.89%	-2.50%	0.00%	4.44%	15.56%	20%
				30' and 35' Buses	2	2	5	12	13	16	19	19	22	24	24
				40' Buses	17	17	21	21	21	19	20	23	25	28	30
				Total Buses	19	19	26	33	34	35	39	42	47	52	54
				Average Fleet Age in Years	12.2	13.2	10.2	8.8	6.6	3.8	3.5	4.2	4.7	5.2	5.7

ratio may need to increase with the opening of a second maintenance facility in Kailua-Kona. Both maintenance facilities will need sufficient spares to operate the required services. The 40-foot buses have an average useful life of 12 years by industry standard, the smaller vehicles generally have a useful life of 7 to 9 years. If MTA contracts for the zone paratransit and flex service, the fleet acquisition plan can be reduced. Therefore, since MTA will have a fleet composed of over 42 percent smaller vehicles (by 2027), the overall average fleet age should be below six years.

5.2.3 Fleet electronics package

Specifications for all buses should include the following three systems:

- **Mobile Data Router and Validators for a fare system**
- **Automatic Vehicle Locator and Automatic Passenger Counting system**
- **Electronic Signage and Next Stop Announcement system**

These three systems will provide MTA with the data needed to provide both internal monitoring purposes, (passenger counting, boarding by stop, on-time performance) and external information for the public including bus location and next stop announcement for those with disabilities and new to the system. The additional cost of these systems has been included in the estimated costs for vehicles.

The CIP includes investigation of adding wifi on buses. A project is identified in FY2022 to conduct this project. There are three elements to providing wifi on moving vehicles: 1) equipment on the buses, 2) providing the data and 3) connectivity. Providing and installing the equipment costs approximately $2,000 per vehicle. Many systems provide wifi at no cost if the provider is allowed to include advertising. The third element of connectivity may be the most difficult to assess. Many parts of the County do not have reliable cell service thereby causing loss of wifi service. The CIP project would identify those areas needing upgrades along with the optimum equipment.

5.3 MAINTENANCE FACILITIES

5.3.1 Hilo Maintenance Facility

For the past two years, MTA has invested in the planning, design, and construction of a new Hilo maintenance facility. The current shared facility with Public Works is outdated and unable to accommodate the needs of the MTA system. The new maintenance facility is due to open in 2018.

This facility will provide all the maintenance for the fleet. Currently, buses are stored in Kailua-Kona and in Kaʻū since the service area is so vast and drivers cannot drive buses to Kona or Pahala from Hilo to start a 4:00 AM trip. Those buses are switched with buses based in Hilo for maintenance to occur.

While the new Hilo structure has already been programmed, it is likely that there will be a need for additional capital expenditures for parts, outfitting the inventory storeroom, software for tracking each bus through preventive maintenance and repairs.

5.3.2 Second Maintenance Facility

Due to the large number of routes operating through the north and west sides of the island, it is recommended that a second maintenance facility be planned. It will likely take several years to go through

Figure 5-1. New Hilo Baseyard Facility

These pictures taken February 2016; Weslin Consulting Services, Inc

the steps of planning, land acquisition, design and construction. Therefore, the capital plan recommends starting as soon as practicable to reserve the desired site. A site near the police department on Hale Māka'i off Highway 19 would be a good location. Certainly, a site owned by a public agency will cost less than one that has to be purchased on the open market.

The CIP includes the planning, design, land acquisition, construction, equipment and installation costs for a transit maintenance and operations facility to be located in the Kailua-Kona area. This second facility would be constructed in the longer term as the Kona system continues to grow. Bus base facility needs are created by changes in fleet size, technology advances, shifts in fleet composition, modifications in service delivery characteristics, introduction of new public transportation modes, and new comprehensive initiatives requiring a substantial transit system response.

Extensive planning is required to identify and investigate alternative sites for a maintenance and operations facility. The County may have land available for the maintenance and operations facility, but the suitability of any possible site needs to be confirmed and evaluated against possible alternative locations. Consideration of non-revenue versus revenue service time and miles by route is a critical component of the evaluation because a poorly located facility can contribute significantly to excess operating costs over the life of the facility. When fuel was relatively expensive this was much more of a concern. But now, even with today's lower fuel costs, unnecessary non-revenue mileage should be considered of paramount importance since low fuel cost may not continue.

The size of the site needs to account for the residual possible site configuration after consideration of topographical constraints and creation of reasonable buffer zones between the site and adjoining land uses. Operational efficiency given knowledge of the existing system and how it might evolve, overall community impacts, evident environmental impacts and other obvious or readily available information for a candidate site. Land costs could be significant for a properly located and sized site. Various resources were researched to determine the best screening criteria to identify the most viable sites including:

- **Zoning: industrial use or compatible current use**
- **Size: five or more acres**
- **Accessibility: ingress and egress for buses**
- **Proximity: relationship to revenue service to minimize deadheading**
- **Compatibility: fit with adjacent land uses**
- **Environmental: avoid wetlands, cultural, sensitive areas and other restricted site considerations**
- **Configuration: ability to use site efficiently to support bus service functions**
- **Topography: relatively level terrain**
- **Availability: available for use or sale**

A site with 5 acres of industrial land would have to be acquired if County land is not available. A smaller site may be viable; however, a maintenance facility should be designed with a 50-year life expectancy and it is recommended that the site be able to serve and store 25 buses. Recent examples indicate that construction costs should be around $200,000 per vehicle or $5,000,000. This generally excludes equipment, installation and other related costs which have been included in the CIP.

5.4 PASSENGER FACILITIES

For the recommended Hub and Spoke Service program described in Chapter Four, three types of passenger facilities are desirable: Hubs, Sheltered Stops, and Bus Stops. Each has different desirable amenities which are shown in Figure 5-2.

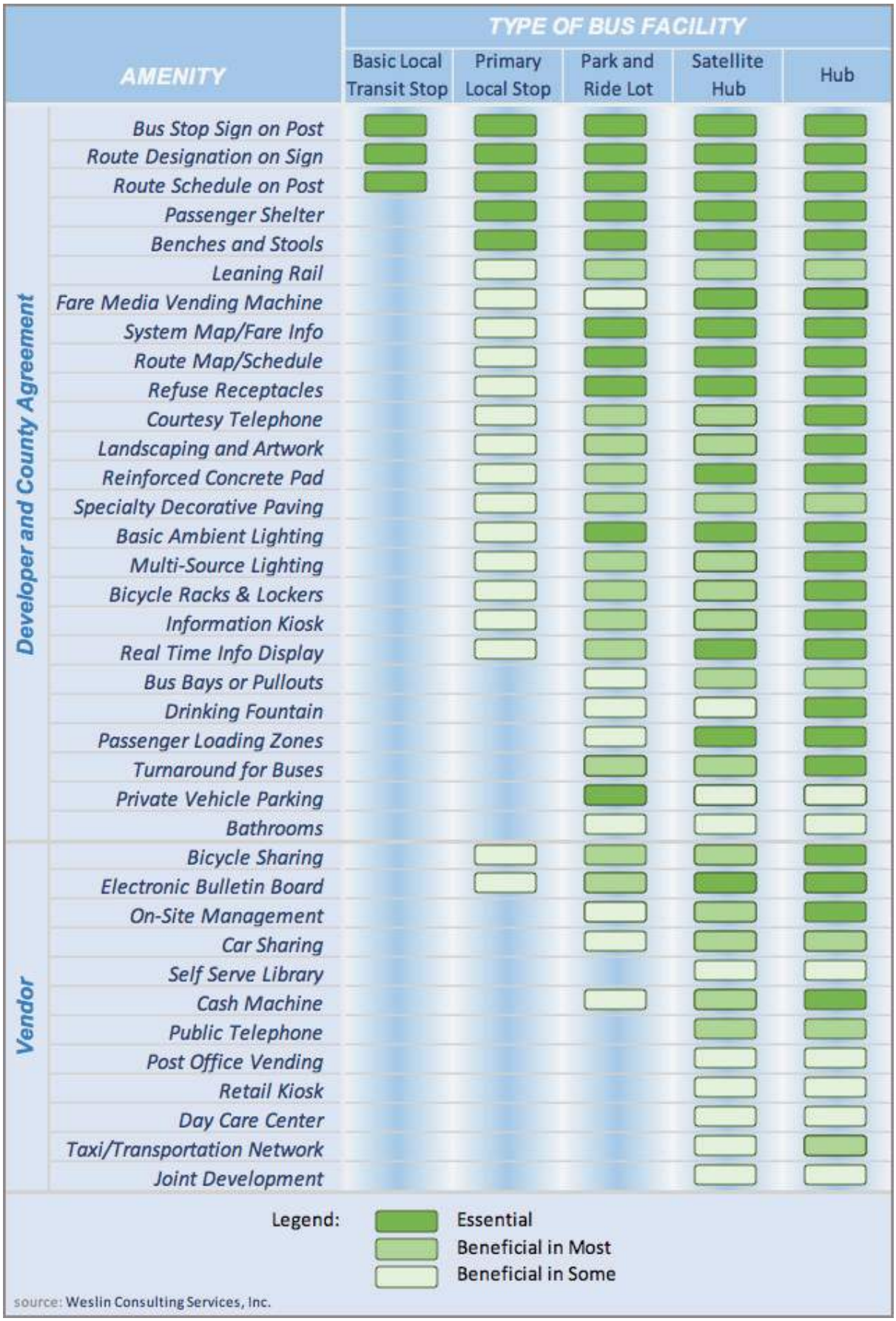
5.4.1 Hubs and Transit Centers

Figure 5-2 identifies two levels of hubs or transit centers: Satellite and Hub. Full Hubs are identified for Mo'oheau Bus Terminal (MBT), Kona, and Pāhoa. These locations, will have buses converging to transfer passengers and need more space for passengers and vehicles. Of these, only MBT is developed, although upgrades are needed.

Hubs, whether satellite or full, provide the most amenities as they serve the most number of passengers. Satellite hubs are those locations that may not have the space for all desired amenities. This would include the current Waimea stop located on Pukalani. This stop is located on street and has a single shelter with seating.

As the system expands, it will become important to have passenger amenities at a Waimea hub, particular-

Figure 5-2. Facility Amenities



ly electronic information and bike parking. Adjacent land is available to add these amenities. Satellite hubs are identified for Waimea, Ocean View, Kea'au, Prince Kūhiō Plaza, and Honoka'a.

Hub planning and design is proposed to start in Fiscal Year 2020 as shown in the financial plan in chapter 6. Construction would begin in 2021 and continue through 2025. Hubs to be developed and updated are shown in Table 5-3.

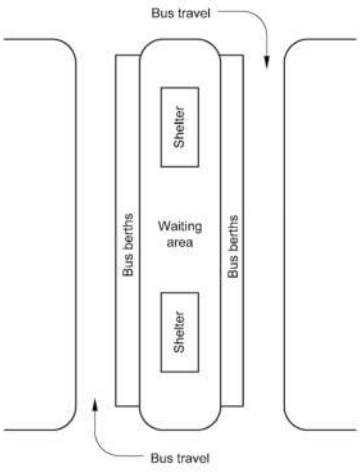
The planning, design, land acquisition and construction of these multiple hubs and transfer point improvements have been grouped together in the financial plan as a single transit center development program comparable to the ongoing bus stop and passenger shelter program. Costs for these major improvements will depend upon extensive site location planning and could vary considerably depending upon land costs and site conditions. Cost estimates are based on the experience of Honolulu over the past fifteen years. Upgrades to current facilities, such as MBT, PKP, and Ocean View, are included in the construction column.

Table 5-3: Recommended Hubs for Hawai'i County

Hub	Year	Description
Pahoa	2021	The initial Pahoa hub would be temporary and located on street and can be implemented in 2019. Two passenger shelters would need to be installed. The permanent Pahoa Hub would be located near the new Puna Kai development and would require more passenger amenities including electronic signage, bike parking, fare machines, restroom.
Waimea	2021	The current Waimea hub is located on street with one passenger shelter. There is insufficient space for additional amenities on the sidewalk. However, adjacent land is undeveloped and may be available for expanded facilities including customer information, bike share, bike parking, fare equipment. Many passengers will cross the street to access shopping opportunities. Therefore, upgraded pedestrian facilities will be appropriate.
Mo'oheau Bus Terminal	2022	MBT is allocated $500,000 for upgrading facilities beyond normal maintenance. Electronic information, fare machines, bike parking, bike share need secure, covered space.
Ocean View	2022	Ocean View Park and Ride has minimal infrastructure with a gravel lot and sign. Upgraded surface, bathroom (can be portable), access signage, shelter, and seating should be added. Lighting needs to be assessed.
Honoka'a	2023	Honoka'a has two areas for bus traffic, the upper lot and lower lot. Both lots need electronic signage, electronic information, bike parking, adequate shelter and adequate seating.
Prince Kūhiō Plaza	2023	Upgrades include electronic signage, fare machines, and additional shelter and seating.
Kona	2024	The Kona Hub will be substantial and requires additional planning and design. The location would not add land acquisition costs. This Hub should be designed to hold a customer service center, bike share, bike parking, restroom, electronic signage and bus bays for a minimum of 7 buses. Potential for coordination with transit oriented development is available.
Kea'au	2025	The Kea'au Hub will include a park-and-ride lot, as well as enough room for 4 buses and passenger amenities. The hub may require land costs (not shown) if landowners are unwilling to deed sufficient space for the hub.

The types of features to be provided at Hubs will vary by site. All facilities should passenger shelter, seating, lighting and trash receptacles. Other considerations include:

- **Access:** Including bus-only signs to access the facility. Drop-off locations and commuter parking areas should be clearly signed. Transit facilities should have pedestrian access such as sidewalks or separated walking areas
- **Bus Stop Positions:** There are two prominent designs for the bus positions: straight curb and saw tooth. MBT has a straight curb design. The individual bus stops at a hub should be constructed with reinforced concrete. Park and ride lots are generally built with asphalt
- **Passenger Waiting Area:** There are three types of passenger waiting areas: center island, plaza and sidewalk. The center island is where buses stop on both sides and passengers can transfer between buses without vehicle conflicts. Plaza designs are similar, but the center pedestrian area is built on a larger scale and may include fountains, food kiosks and other services



  The third type is the sidewalk, where the majority of passengers are waiting in the sidewalk area. This is envisioned for the initial Pahoa hub and currently occurs at Waimea. It is important to make sure this design does not encourage passengers crossing a street to access their next bus
- **Lighting:** A range of lighting treatments are employed at the transit facilities from standard high-mast street lamps to specialized lighting treatments designed specifically for a facility such as in-ground lighting. Passenger shelters at hubs should have overhead lights underneath the shelter roof
- **Passenger Seating:** A variety of seating treatments are provided at the transit facilities. These include individual stools, standard benches, supplemental seating offered by large tree planters and other landscaping features (such as low, decorative walls
- **Bicycle Access and Storage:** These amenities including bicycle racks and lockers will become more important as the County embraces multi-modal transportation. Bicycle access routes will need to be clearly defined. Connecting bicycle facilities to transit centers helps extend the trip length for cyclists and reduces automobile travel. Secure bicycle parking must be provided at or within close proximity to the passenger waiting area. At a minimum, the accommodations can be bike racks or lockers. Bike stations and automated bicycle parking can be located at areas with high levels of transit and bicycle use. Bike Sharing stations should be located near major hubs or bus stops
- **Passenger Shelter:** Passenger shelter should be provided at all major facilities for waiting passengers. Shelters can be the standard sized passenger shelter such as those located in Waimea or Kurtistown. Other facilities can have larger, unique shelter designs matching adjoining land use. For example, a new Kona Hub should be incorporated into the planned Transit Oriented Development design
- **Public Restrooms:** Restrooms should be provided at all hubs
- **Way-Finding Display or Maps:** Way finding should be at all hubs. These tie community destinations to transit and provide information for tourists
- **Vending:** Newspaper/free publication machines, vending snack/drink machines, ATM's, can be considered
- **Communication/Public Telephones:** All transit hubs should have signs indicating which bus routes stop at the individual bus positions. Electronic reader boards indicating bus arrival times are important to the transit user
- **Community Functions:** Available space should be set aside for functions including Goodwill drop offs, staffed customer service offices, recycle facilities, day care center or other community functions

5.4.2 Bus Stops and Shelters

5.4.2.1 Formalizing Bus Stops

Formalizing a bus stop includes determining what type of amenities should be included at the bus stop. The most basic of bus stops would have a sign, route designation, and route schedule. Each bus stop needs to have a unique bus stop number as shown in the example from Honolulu in Figure 5-3. These numbers need to be posted at each bus stop.

MTA is currently in the process of developing a system app which intending passengers would use to get current information including when their bus is expected to arrive. A waiting passenger can then type in the posted bus stop number to get real time information on the next bus arrival time.

5.4.2.2 Bus Shelters and Benches

Amenities include signs, benches, shelter, information, lighting and others identified in Figure 5-2. The planning, design, procurement, land acquisition and construction line items in the CIP are to fund bus stop locations. The MTA and County need to determine which stops will have benches and/or shelters. Primary Local Stops would add passenger shelters and seating to the basic stop amenities. As shown in Figure 5-2 there are other amenities that might prove beneficial to the passenger. Adding additional amenities would be dependent upon safety and space concerns, as well as passenger usage at that stop and route frequency.

Generally, the more frequent the route the less amenities are needed. For example, if a route has 15-minute service or less, then perhaps real-time information is not necessary as it is known a bus will arrive every 15 minutes. However, if a route has a limited number of trips, such as Route 10 Hilo-Volcano, then it becomes more important to have information and seating, especially if that stop has more than 20 people boarding at that location. Guidelines for stop amenities need to be flexible. It becomes more important if a bus stop serves predominantly elderly passengers such as one located by a senior center, to have shelter and seating even if the number of daily passengers is limited. Figure 5-4 shows a simple bench recently placed on O'ahu.

Figure 5-3 Basic Stop Identification Sign

Figure 5-4 Simple Bus Bench (O'ahu)

Figure 5-5 Current Design of Shelters in Hawai'i County (Kuristown)

Figure 5-6 Design used on Ana Keohokalole in Kona

The type of passenger shelter that Hawai'i County is currently using is shown in Figure 5-5 which is a recent new shelter in Kuristown. Figure 5-6 shows the shelter design and bus pullout used on Ane Keohokalole.

5.4.2.3 Park and Ride Lots

Park and Ride lots require additional amenities; in particular, lighting and bathrooms. Most park and ride lots serve commuters. Hele-On's commuters leave in the early morning hours when it is dark. Lighting adds safety. Bathrooms (even portable) become necessary for many commuters. Commuter trips are long especially Hilo to Kona or Pahala to Kona. In many cases, passengers have driven or been driven over 30 minutes to access the bus (Puna locations to Hilo) and their bus trip may be up to two hours to their job site. Having a bathroom available can make a difference to an intending passenger.

5.5 FARE COLLECTION

Most transit systems now have the ability to use the same fare media for various types of passes and trip based fare payment programs. There are four basic types of pass media used:

- **Non-magnetic Pass:** A single piece of paper, cardboard or some other material without a magnetic strip good for an unlimited number of trips during a specified time period that is not surrendered or altered as each trip is taken.
- **Magnetic Stored-Value Pass:** A single piece of paper, cardboard or some other material with a magnetic strip good for an unlimited number of trips during a specified time period that is altered by machine removal of some or all of the stored value as each trip is taken.
- **Magnetic Stored-Time Pass:** A single piece of paper, cardboard or some other material with a magnetic strip good for an unlimited number of trips during a specified time period that is not surrendered or altered as each trip is taken.
- **Smart Cards:** A single piece of material without a magnetic strip but with a small computer chip good for one or more trips that is usually not surrendered but altered by machine removal of some or all of the stored value as each trip is taken.

Most systems are now using some form of magnetic based stored value or time base cards as shown in Table 5-4. Many systems are using multiple types of fare media with 42% reporting they are still using non-magnetic passes. Honolulu is in the process of implementing a smart card fare payment method. The technology chosen by Honolulu is capable of including bike share and parking payments with the same card. Honolulu has discussed having the same technology being able to be used on all transit systems in Hawaii. MTA will need to upgrade their fare collection system in the next ten years and would benefit from joining Honolulu's system.

Table 5-4. National Fare Media Examples

Fare Media Type	# of Systems	% of Systems Reporting
Non-Magnetic Passes	65	42%
Magnetic Stored-Value Cards	52	34%
Magnetic-Stored-Time Cards	79	52%
Smart Cards	44	29%

Source: 2014 American Public Transportation Association Survey of 153 Bus Systems

Fare collection systems are continuously evolving to incorporate new technologies and methods to improve efficiency, reliability and convenience. Use of Smart Card fare media is increasing and replacing older technologies. Over the past year the percent of bus systems using smart cards increased from 25% to 29%. This trend is expected to continue. This is because of the substantial benefits of smart cards. Some of the benefits of advanced fare media systems include:

- **Customer Convenience:** People of all ages and abilities, whether frequent or occasional riders, are offered pricing that fits their personal need using fare products at a variety of prices that are easy to use. Methods of payment for smart cards include the use of devices that only need to be in close proximity to the reading device. Smart cards need not be a "card" but can be a "bracelet" such as shown to the right
- **Service Requirements:** Smart cards can be used on any type of transit service offered in any location. Smart card technology was originally applied to just large rail systems. Those systems then partnered with connecting bus systems. Those applications were expanded to paratransit services. Honolulu is now in the process of procuring a comprehensive smart card system that will start with the bus and paratransit operations before the rail system is operational
- **Complete Data Recording and Processing:** Transit fares comprise a significant portion of transit system funding, so it is critical fare collections systems are accurate, complete and secure in accepting and processing revenue. The fare collection and validation systems provide the ridership data for transit service development and refinements

Figure 5-7 Smart Bracelet